

CLAIMS

The listing of the claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (previously amended) A method of depositing a silicon based film on a wafer characterized in that at least one silicon containing precursor and at least one chemical precursor are introduced into a single-wafer hot-wall rapid-thermal chemical vapor deposition chamber housing the wafer and having a plurality of heating elements above the wafer, and in that energy is applied to the plurality of heating elements to heat the wafer to a temperature of 400-550 °C, wherein the precursors react to form a silicon based film on the wafer at a deposition rate of approximately 1000 Å/min. or greater.
2. (currently amended) The method of claim 1 wherein said silicon based film deposited on the wafer exhibits uniformity of < 2% 1σ or less. ~~has a thickness variation of about 2% 1σ or less.~~
3. (Original) The method of claim 1 wherein said at least one silicon containing precursor is comprised of any one of or combination of SiH₄, SiCl₂H₂, Si₂H₆, Si₂Cl₆, SiCl₃H, or SiCl₄.
4. (Original) The method of claim 1 wherein said at least one silicon containing precursor is Si₂H₆ and said at least one chemical precursor is NH₃.
5. (Original) The method of claim 1 wherein said at least one chemical precursor is a nitrogen source selected from the group of NH₃, alkyl amine, hydrazine, alkylhydrazine, alkyl amide, alkyl imide, and atomic nitrogen.
6. (Original) The method of claim 1 wherein said method is carried out at a pressure in the range of about 10 to 500 Torr.
7. (previously amended) The method of claim 1 wherein said method is carried out at a pressure in the range of about 100 to 200 Torr.
8. (currently amended) The method of claim ~~4~~ 5 further characterized in that the nitrogen source precursor ~~an inert gas~~ is introduced into the hot wall thermal chamber at a flow rate of about 10 to 10,000 sccm.

9. (previously amended) The method of claim 1 further characterized in that an oxidant is introduced into the hot wall thermal chamber, and wherein the oxidant is comprised of any one of or combination of ozone, O_2 , NO, N_2O , H_2O , H_2O_2 and atomic oxygen.

10. (Original) The method of claim 1 wherein the silicon containing precursor is conveyed at a flow rate in the range of 10 sccm to 500 sccm.

11. (previously amended) A method of depositing a silicon based film on a wafer in a single-wafer hot-wall rapid-thermal chemical vapor deposition chamber having a plurality of heating elements, comprising the steps of:

positioning the wafer in the chamber and under the heating elements;

applying energy to the plurality of heating elements to heat the wafer to a temperature in the range of 400 to 550°C;

reacting at least one silicon containing precursor and at least one nitrogen containing precursor to deposit a silicon based film on the wafer while the wafer is being held at the temperature.

12. (Original) The method of claim 11 wherein said at least one silicon containing precursor is comprised of any one of, or combination of SiH_4 , $SiCl_2H_2$, Si_2H_6 , Si_2Cl_6 , $SiCl_3H$, or $SiCl_4$.

13. (Original) The method of claim 11 wherein said at least one silicon containing precursor is Si_2H_6 and said at least one nitrogen precursor is NH_3 .

14. (Original) The method of claim 11 wherein said at least one nitrogen precursor is comprised of any one of or combination of NH_3 , alkyl amine, hydrazine, alkylhydrazine, alkyl amide, alkyl imide or atomic nitrogen.

15. (Original) The method of claim 11 wherein said method is carried out at a pressure in the range of about 10 to 500 Torr.

16. (previously amended) The method of claim 11 further comprising introducing an oxidant into the chamber, and wherein the oxidant is comprised of any one of or combination of ozone, O_2 , NO, N_2O , H_2O , H_2O_2 and atomic oxygen.

17. (previously amended) A method of depositing a silicon based film on a wafer in a single-wafer hot-wall rapid-thermal chemical vapor deposition chamber having a plurality of heating elements, comprising the steps of:

positioning the wafer in the chamber and under the heating elements;

applying energy to the plurality of heating elements to heat the wafer to a temperature of up to approximately 550 °C;

establishing the pressure in the chamber in the range of approximately 10 to 500 Torr;

conveying at least one silicon containing precursor comprised of any one of, or combination of SiH_4 , SiCl_2H_2 , Si_2H_6 , Si_2Cl_6 , SiCl_3H , or SiCl_4 , and at least one nitrogen containing precursor comprised of any one of or combination of NH_3 , alkyl amine, hydrazine, alkyhydrazine, alkyl amide, alkyl imide or atomic nitrogen; and

reacting said silicon and nitrogen containing precursors to deposit a silicon based film on the wafer.

18. (currently amended) The method of claim 17 wherein the silicon based film is deposited at a deposition rate of about 500 Angstrom ~~or greater~~.

19. (Original) The method of claim 18 wherein the silicon based film is deposited at a deposition rate of about 1000 Angstrom or greater.

20. (currently amended) The method of claim 19 wherein the silicon based film exhibits uniformity of < ~~has a thickness variation of about 2% 1σ or less~~.